3.5 COMMERCIAL AND RECREATIONAL FISHING

This section describes commercial and recreational fishing in the vicinity of the shell mounds, and considers how the different Program Alternatives would affect fishing activities and resources. Seven commercial methods, including trawling, seining, drift and set nets, traps, hook and line, and diving have been used in the study region. Predominant species have included mackerel, sardine, anchovy, halibut, bonito, shellfish, and sea urchins. Recreational fishing at the shell mounds currently focuses on sculpin and sandbass, while kelp bass and rockfish were targeted and abundant prior to platform removal (de Wit 2001). Salmon fishing also occurs seasonally in the general area (pers. comm., T. Raftican, United Anglers, 2002).

3.5.1 Environmental Setting

3.5.1.1 Commercial Fishing

The California Department of Fish and Game (CDFG) reports commercial marine fish catch and gear type(s) by Fish Block, a system of 10-minute latitude by 10-minute longitude areas. The four shell mound sites, all of which are located inside the 3-nm limit (i.e., within State waters) are within Fish Block 652 (see Figure 3.5-1). Fish Block 652 extends along the coastline from west of Santa Barbara to Carpinteria and offshore out to approximately 5 miles (8 km). Water depths within Fish Block 652 range from the shoreline to a maximum of approximately 160 ft (49 m).

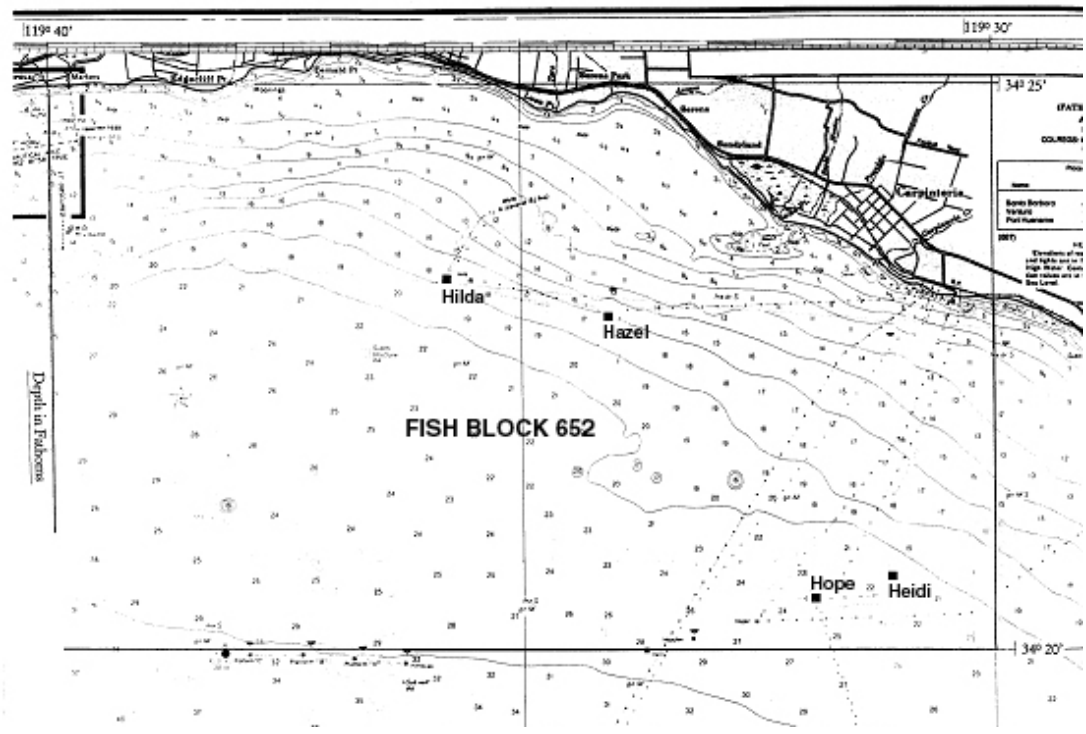

Figure 3.5-1. California Department of Fish & Game, Fish Block 652

CDFG-provided catch data from Fish Block 652 for the most recent 5 years (1997-2001) indicate that, as previously stated, seven commercial gear types (seine, drift net, hook and line [including trolling], trawl, set net, trap, and diving) have been used within that area. Seining catch has decreased substantially over the period and drift netting, generally a deep-water fishing method, has not contributed significantly to the catch from Fish Block 652 during the 5-year period. The CDFG also provides annual catch data, by species code, for each block. Table 3.5-1 summarizes the total pounds reported caught by gear type during the 5-year period from 1997-2001.

Table 3.5-1. Commercial Fish Catch (Pounds) by Gear Type from Fish Block 652 (1997-2001)

Gear Type	*1997*	*1998*	*1999*	*2000*	*2001*	*Total*
Seine[1]	88,347	25,282	0	0	0	113,629
Trap[2]	38,554	13,890	7,745	13,900	75,450	149,539
Dive	22,775	5,014	4,781	8,698	827	42,095
Trawl	3,713	14,174	22,943	42,479	4,204	87,513
Hook & Line[3]	1,767	1,380	886	3,212	6,924	14,169
Set Net	4,159	98	2,255	21,986	16,114	44,612
Drift Net	0	0	0	0	208	208
Unknown	0	14	48	0	0	62
Total	159,315	59,849	38,661	90,275	103,727	451,827

Source: CDFG, unpublished.
[1] Includes purse, lampara, and other seines.
[2] Includes fish, crab, and lobster traps.
[3] Includes set lines, trolling, longlines, and other hook and line types.

These data show that trap fishing for rock crab, spider crabs, and lobster contributed over one-third of the total reported catch by weight for Fish Block 652 for the period, while trawling contributed approximately 19 percent of the total. Seining for pelagic species (chiefly sardines, mackerel, and anchovies) accounted for the largest portion of the reported catch during the first 2 years of the period, but ceased in 1999 (Table 3.5-1). Although no single gear type consistently contributes the largest percentage of the reported catch, the trap fishery consistently accounts for a relatively large amount.

Trap operations (particularly for crab and lobster) and trawling are “focused” fisheries, usually targeting species within a relatively narrow range of substrate types and water depths. Lobsters, brown, and red rock crabs are caught primarily in rocky areas, while yellow rock crabs (despite the name) and sheep crabs (also known as spider crabs) occur on sandy areas (CDFG 2001a). Trawling occurs over sandy bottom areas at depths that depend on the habitat preferences of the species being fished and on applicable fishing regulations. Trawling for halibut, sea cucumbers, and prawns occurs at depths similar to those where the shell mounds are located, with prawns generally

collected further offshore than the shell mound sites. Trawling in State waters (inshore of the 3-nm limit) within portions of the Santa Barbara Channel is allowed between June 16th and March 14th from Pt Arguello to Pt Mugu for halibut and cucumbers only (pers. comm., J. Kraus, CDFG, 2003). All shrimp trawling occurs outside of the 3-nm limit). Water depths usually targeted for demersal (bottom-associated) species are: rock crab 60 to 240 ft (18 to 73 m), lobster 20 to 120 ft (6 to 37 m), ridgeback prawn 180 to 540 ft (55 to 165 m), halibut 20 to 270 ft (6 to 82 m), and sea cucumbers from the 3-nm limit to 300 ft (91 m) (MBC Applied Environmental Sciences 1989, and interviews with commercial fishers). Urchin diving occurs around natural rock habitats and in water depths of 100 ft (31 m) or less.

Table 3.5-2 lists the seven most abundant commercial taxa caught during 1997-2001. Data in this table generally support the gear type summary discussed above by showing that trap fishing for crab and lobster contributed a substantial percentage of the total catch within Fish Block 652, seine catches are large but irregular, and urchin diving is relatively consistent.

Table 3.5-2. Abundant Commercial Taxa from Fish Block 652 (1997-2001)

Species	*Total Pounds*	*Gear Type(s) Used*
Pacific Mackerel	88,659	Seine
Rock Crab (unspecified)	85,659	Trap
Ridgeback Prawns	68,032	Trawl
Red Urchin	40,029	Dive
Lobster	38,045	Trap
Bonito	25,282	Seine
Halibut	24,906	Hook & Line, Trawl, Set Net
Source: CDFG, unpublished.		

The most common commercial fishing activities near the shell mounds are crab and lobster trapping, trawling for halibut and sea cucumbers (outside 1-nm from shore between June 16 and March 14), and trawling for ridgeback prawns (outside the 3-nm limit, offshore of the two deeper shell mounds) (pers. comm., C. Fusaro, JOFLO, 2002; pers. comm., J. Kraus, CDFG, 2003). Although not in the seven most abundant taxa, sea cucumbers contributed 8,890 pounds to the total pounds caught in Fish Block 652 during 1997-2001, and were recorded in all 5 years listed.

The CDFG also provides total commercial landings data by region. The Santa Barbara Region includes the ports of Santa Barbara, Ventura, Oxnard, and Hueneme. Table 3.5-3 lists the five most abundant taxa from Fish Block 652 and their percent contribution to the region for 2000 and 2001 only. The trap fisheries and halibut (caught by several gear types) each contributed between 3 and 5 percent of the reported catch and landings in the region.

Table 3.5-3. Contribution of Five Most Abundant Commercial Taxa from Fish Block 652 to Total Reported Landings within the Santa Barbara Region (2000 and 2001)

Species	*Total Pounds from Fish Block 652*	*Total Pounds Landed (SB Regional Ports)*	*Percent Contribution of Fish Block 652 Catch*
Rock crab (unspecified)	59,417	1,256,555	4.7
Lobster	32,381	458,256	3.9
Halibut	18,454	495,663	3.7
Ridgeback prawn	32,381	1,728,837	1.9
Sea cucumber	6,155	1,079,972	<1.0

De Wit (2001) identifies a 0.5-nm (0.9-km) "safety zone" around each mound where halibut trawling does not occur because of the fishers' concerns over loss of or damage to their gear. Trawlers report that debris scattered around the periphery of the mounds can spoil their catch as well as damage gear.[1] The precluded area represents a total of about 3.4 nm^2 (11.7 km^2 or 3,882 acres), which is 10.7 percent of the seafloor in Fish Block 652 that is at water depths of 50 to 160 feet (16 to 48 m) and potentially suitable for halibut trawling (de Wit 2001).

3.5.1.2 Recreational Fishing

In summarizing conversations with recreational fishing boat operators at Sea Landing, Santa Barbara, de Wit (2001) reports that the 4H Platforms, prior to their removal, provided relatively productive areas for recreational catches of kelp bass and rockfish. While salmon have been caught around the shell mounds, little recreational effort has been expended there after the platform structures were removed. According to McCrea and Diamond (cited in de Wit 2001) the shell mounds are now of only limited recreational fishing value, with the most commonly caught species including croakers, sandbass, and sculpin. Based particularly on commercial fisheries data, the sedimentary bottom surrounding the shell mounds supports halibut, and water column species such as mackerel and bonito also occur within the area. Similar habitat is found closer to the primary recreational fishing centers in Santa Barbara and Oxnard.

3.5.2 Regulatory Setting

No fisheries-specific permits would be required for any of the Program Alternatives. However, applicable local, State, and federal agencies will likely require that notifications be provided to local groups. For example, the Joint Oil/Fisheries Liaison Office (JOFLO) in Santa Barbara has historically requested that applicants and/or

1 Scoping comment letter from Mike McCorkle, president Southern California Trawlers Association, July 8, 2002.

agencies provide notice of offshore activities at least two weeks in advance, and that the notice should: (1) describe the proposed action, (2) include a map of the site(s), and (3) discuss the expected project duration. In addition to informing the JOFLO, notices should also be placed at the Harbor Masters offices in Morro Bay, Avila, Santa Barbara, Ventura, Channel Islands, and Hueneme.

3.5.3 Significance Criteria

In general, adverse impacts to commercial and/or recreational fishing activities within the region and site could result from the following:

- Loss of fishing area during removal, spreading, reef enhancement, or capping operations;
- Continuing loss of trawlable seafloor if mounds remain or are spread over natural seafloor habitats;
- Uptake of shell mound-associated contaminants by fisheries species caught for commercial or recreational purposes;
- Increased vessel traffic;
- Gear damage or loss from fouling by shell mound debris;
- Oil spills from vessels and/or active pipelines that could be damaged during anchoring and/or removal operations; and
- Explosive demolition of the caissons.

Significant adverse fisheries-related impacts are defined as those that:

- Substantially interfere with commercial or recreational fishing in areas currently occupied by the shell mounds, for more than 1 month during open fishing season(s);
- Preclude trawling within a substantial area where it would otherwise be permitted;
- Substantially increase the area of altered (untrawlable) seafloor beyond the existing shell mound footprints for more than 1 season;
- Substantially increase the exposure of commercially or recreationally fished species to toxic substances; or
- Cause substantial losses of commercially or recreationally fished species or their habitats.

For this assessment, the “region” is defined as the seafloor and water column within Fish Block 652, and the “site” is the area occupied by and including each mound.

3.5.4 Impacts and Mitigation Measures

The potential for impacts to commercial and recreational fishing varies for each of the component actions and Program Alternatives identified in Table 1-1. The following sections address potential impacts associated with each Program Alternative. Impacts are identified in summary tables, along with the location of the impact and impact class (defined in Section 3.0). Following each summary table, the impacts are described, measures to mitigate potentially significant adverse impacts are identified, and "residual impacts" (impacts following implementation of mitigation measures) are discussed. Less-than-significant impacts (Class III) and beneficial impacts (Class IV) are described where appropriate. Table 3.5-4, at the end of this section, provides a summary of impacts, corresponding mitigation measures, and impact classes.

3.5.4.1 Program Alternative 1 (PA1): Shell Mounds and Caissons Removal and Disposal

PA1 involves the use of: (1) a barge-mounted, sealed clamshell bucket dredge to remove shell mound materials; (2) explosives and mechanical methods to demolish the caissons at the Hazel site; (3) smoothing of the seafloor across each site with a "gorilla net" trawl to remove remnant materials; and (4) transport of removed materials to POLB or LA-2 for disposal. Barges would be moored at each site via a three- or four-point anchoring system.

Program Alternative	*Impact #*	*Impact Description*	*Region/Location*	*Class*
PA1	**CRF-1**	Removal of the 4H shell mounds would permanently remove contaminated sediments associated with the shell mounds from the marine environment.	Offshore Santa Barbara County (shell mound sites)	IV

Impacts: Permanent Removal of Contaminated Sediments

As discussed in Section 3.2.4.1, removal of the shell mounds would eliminate risks of contaminant releases that could occur if the shell mounds were left in place and later disturbed by natural (e.g., storms, animal burrowing, subsidence) or human causes (e.g., trawling, anchoring). Specific impacts could include acute toxicity and contaminant bioaccumulation in bottom-dwelling organisms exposed to dispersed mound materials. Eliminating these risks is a beneficial (Class IV) impact to commercial and recreational fishing.

Program Alternative	*Impact #*	*Impact Description*	*Region/Location*	*Class*
PA1	**CRF-2**	Commercial and recreational fishing would be precluded in the project vicinity during project activities.	Offshore Santa Barbara County (shell mound sites)	II

Impact: CRF-2

Class II (significant but mitigable) impacts to some fisheries are probable due to restricted fishing activities within the anchor patterns of the dredge and barges, plus an estimated 0.25-mile (0.4 km) radius "safety zone" around each anchor. This restriction is expected to last at least 1 month (4 days per mound removal, 2 to 3 days per mound for smoothing, and 2 to 5 days per mound for post-removal surveys), but preclude only the area associated with one shell mound site at a time. Demolition and removal of the Hazel caissons is estimated to require an additional 28 to 40 days. The area of preclusion would likely lie within the 0.5-nm (0.9-km) "safety zone" currently observed by halibut trawlers because of the fishers' concerns over loss of or damage to their gear on the shell mounds), so impacts to trawl fishers are not expected to increase above existing conditions due to dredging activities. Trapping and hook-and-line fishing, which are not currently precluded, would be precluded during the removal activities.

MITIGATION MEASURE(S) FOR IMPACT CRF-2

CRF-2a *The Applicant shall provide 30-day advance notice of pending activities at the shell mounds sites to enable fishers to avoid the affected area. Specifically, the Applicant shall ensure that: (1) notification is received by the Joint Oil/Fisheries Liaison Office and posted at the Harbor Masters offices in Morro Bay, Avila, Santa Barbara, Ventura, Channel Islands, and Hueneme; and (2) project information is provided in the Local Notice to Mariners issued by the Eleventh Coast Guard District. Information provided shall include, at a minimum, a description of the proposed action, a map of the project site(s), and an estimate of the expected duration of project activities.*

CRF-2b *The Applicant shall compensate fishers who are able to demonstrate a loss of catch. Compensation shall be based on the average of the previous five years catch during the season and area of activity.*

RESIDUAL IMPACT(S)

MM CRF-2b is designed to offset the loss of fishing catch. Providing notice and compensation to affected fishers relieves the disruptive effects and added costs of having to either forego fishing or move into other areas that may already be utilized. An alternative measure, to restrict the removal activities to a narrow seasonal window to avoid the halibut trawling season, was considered but rejected because it would be of questionable value given that trawlers already avoid the immediate area of the shell mounds, and it would not necessarily benefit other types of fishing that would be affected. The residual impact would be less than significant (Class III).

Program Alternative	*Impact #*	*Impact Description*	*Region/Location*	*Class*
PA1	**CRF-3**	Contaminants, including oil, released during project operations will disperse into the water column and onto the seafloor, resulting in the exposure of commercially and recreationally fished species to contaminants, with potential toxic or bioaccumulation effects (see WQ-2, WQ-3, and MB-2).	Offshore Santa Barbara County (shell mound sites)	II

Impact: CRF-3

This impact is discussed under WQ-2, WQ-3 and MB-2 in Sections 3.2 and 3.3, respectively. The same considerations apply to commercially and recreationally fished species, with the added concern that tissue contaminant levels in species caught for consumption could also become elevated as a result of exposure.

MITIGATION MEASURE(S) FOR IMPACT CRF-3

MMs WQ-2a through 2e, WQ-3a and **MB-2a** would apply to this impact.

RESIDUAL IMPACT(S)

Measures identified under WQ-2 and WQ-3 will help to minimize the dispersal of contaminants and exposure to biota, including species of commercial and recreational importance. Similarly, MM MB-2a would help to minimize the potential that dredging and anchoring activities result in the breakage of the active oil pipeline near the Hope shell mound. Residual impacts would be less than significant (Class III).

Program Alternative	*Impact #*	*Impact Description*	*Region/Location*	*Class*
PA1	**CRF-4**	Explosive demolition of the caissons at the Hazel site will result in the mortality of fishes that are commercially or recreationally harvested in the immediate vicinity.	Offshore Santa Barbara County (Hazel shell mound site)	II

Impact: CRF-4

This impact is discussed under MB-6 (Section 3.3) and applies to species, including commercially or recreationally harvested species, of fish with swim bladders that would be vulnerable to overpressures in the water column. Because invertebrates lack a swim bladder, the effects of explosives would be limited to direct blast effects that, however, are confinable within a few feet of the demolition area. No overpressure effects beyond this immediate area are expected, and effects on local populations of crabs, cucumbers, or lobsters would be insignificant.

MITIGATION MEASURE(S) FOR IMPACT CRF-4

MM MB-6a would apply to this impact.

RESIDUAL IMPACT(S)

As discussed under MB-6, procedures required pursuant to MM MB-6a will prevent mortality to large aggregations of fishes through implementation of such provisions such as: pre-explosion detection of large aggregations of fish at the demolition site using sonar and/or on-site observers; delaying detonations if appropriate; and provisions for the immediate collection of killed fish at the surface and appropriate disposition (e.g., donation or onshore disposal). Residual impacts would be less than significant (Class III).

Program Alternative	*Impact #*	*Impact Description*	*Region/Location*	*Class*
PA1	**CRF-5**	The transport of materials may interfere with fishing boats, result in accidental spillage that could expose fishery resources to contaminants, or otherwise conflict with fishing activities.	En route to/from and at shell mound sites	II

Impact: CRF-5

The potential impacts to fisheries that could result from the transport and disposal of the removed material are generally related to the effects of increased vessel traffic and the potential conflicts between barges transporting the material and fishing boats, as well as to spills of fuel or materials. This impact is essentially the same as MB-4 (see Section 3.3), but applies to fishery resources and fishing activities in particular, as well as to marine biota in general. The magnitude and class of impact would depend on the material and the volume of materials spilled. For example, if a large quantity of dredged materials was spilled or dumped in a single location, the impact would be considered Class I (significant and unmitigable), similar to Impact CRF-6 and MB-5 (see below and Section 3.3). Smaller spills would be a Class II impact that could be mitigated through proper containment of such materials so as to avoid incidental spillage; spillage of the caissons' components during transit, which could potentially affect trawlers depending on the location of the spillage, could be mitigated in a similar manner.

MITIGATION MEASURE(S) FOR IMPACT CRF-5

MMs MB-4a and **MB-4b** would apply to this impact.

RESIDUAL IMPACT(S)

With MM MB-4b, losses of dredged sediments during transport will be minimized through proper containment of such materials so as to avoid incidental spillage. Under MM MB-4a, the use of established vessel traffic corridors will enable fishers and other vessels to anticipate the location of transport activities, thereby lessening conflicts should a spill occur. For a major spill resulting in the dumping of a full load of materials,

residual impacts would be significant and unmitigable; otherwise, residual impacts would be less than significant (Class III).

Program Alternative	*Impact #*	*Impact Description*	*Region/Location*	*Class*
PA1	**CRF-6**	Ocean disposal of shell mounds sediments at LA-2, if approved, would have potentially toxic effects on marine biota.	LA-2 (or other ocean disposal site)	I

Impact: CRF-6

Based on the results from sediment testing (AMEC 2002) indicating that the shell mound materials are unsuitable for ocean disposal because they do not meet the LPC for sediment quality (benthic effects and bioaccumulation), disposal of the shell mounds sediments at the LA-2 disposal site would have significant effects on marine biota. Because there is no feasible mitigation that would remove contaminants from the materials prior to disposal, Impact CRF-6 is not mitigable (Class I).

MITIGATION MEASURE(S) FOR IMPACT CRF-6

None proposed.

RESIDUAL IMPACT(S)

Since mitigation is not feasible for disposal at LA-2, the residual impact remains significant (Class I).

Program Alternative	*Impact #*	*Impact Description*	*Region/Location*	*Class*
PA1	**CRF-7**	Removal of the 4H shell mounds and caissons would restore trawling and other types of fishing to the areas occupied by and adjacent to the mounds where such fishing activities have been prevented.	Offshore Santa Barbara County (shell mound sites)	IV

Impact: CRF-7

Removal of the shell mounds and caissons will restore natural seafloor conditions on approximately four acres of the seafloor and allow the possibility of trawling in an estimated area of 3.4 nm^2 (11.7 km^2 or 3,882 acres), as explained at the end of Section 3.5.1.1. This would represent a beneficial impact to trawling, with attendant impacts on such fishery. The loss of the mixed shell and mud "habitat" of the shell mounds would not significantly affect commercial or recreational fishing.

3.5.4.2 Program Alternative 2 (PA2): Leveling and Spreading of Shell Mounds with Caissons Removal and Transport

PA2 involves the use of a standard clamshell dredge to spread or level most of the shell mound materials within an approximate 300 to 1,000 feet (91 to 305 m) radius area around each platform site. Spreading would result in deposition of approximately 1 foot (0.3 m) of shell mound materials over the natural sediments within this area. The remnant Hazel caissons would be removed and transported for disposal using methods previously described, and smoothing of the material would be accomplished with a "gorilla net." Impacts and proposed mitigation measures discussed under PA1 above are also applicable to PA2.

Spreading of the shell mound materials would increase, for an indefinite period, the area where trawling and other types of fishing are prevented (Impact CRF-2). Trawling and possibly other types of fishing would be disrupted at least until the sediments disturbed by spreading have settled, the caissons have been removed, and smoothing has been completed; testing would then need to confirm that contaminant levels in sediments at and adjacent to the former shell mound sites pose no risk to the consumption of fish and invertebrates caught in the area. This additional loss of area remains a Class II impact that can be mitigated through implementation of MM CRF-2b, which provides compensation for loss of fishing catch.

CRF-3 is considered a Class I impact for PA2. Spreading activities would bury approximately 27 acres of natural seafloor habitat with shell mound materials. This would increase the area of natural seafloor and biota that would be subjected to the effects of contaminants found within that material. Although not definitively demonstrated to date, any significant increase in the concentrations of toxic materials in the tissues of commercial taxa would be considered a Class I impact. Further, the potential for tainting of fish and invertebrates caught within the area into which the material is spread could reduce its use by the trap and trawl fisheries. Accordingly, CRF-7, the beneficial impact of shell mounds and caissons removal, is not recognized for PA2. Natural processes of diffusion, microbial degradation of hydrocarbons, sediment reworking by burrowing organisms, and the uptake and metabolism of contaminants by organisms are expected to reduce the available concentrations of contaminants over time, although the rate at which this will occur is uncertain. Impacts of explosive use (CRF-4) would be the same for PA2 as PA1, since the same methods would be employed for both Program Alternatives. Impacts during transit (CRF-5) would be less than those for PA1, since: (1) dredged shell mound materials would not be transported (as in PA1), and (2) spillage of the caissons' components would not be expected to cause a significant release of contaminants, although they could still adversely affect trawling depending on the location of a spill.

ADDITIONAL MITIGATION MEASURE(S) FOR PA2

None proposed.

RESIDUAL IMPACT(S)

Residual impacts would involve the dispersal of exposed contaminated sediments over a much wider area than the encased shell mounds currently occupy, and although contaminant concentrations are expected to decline over time, the residual effects remain significant (Class I).

3.5.4.3 Program Alternative 3 (PA3): Capping

PA3 entails placement of sandy material on top of the existing shell mounds. Capping would require anchoring vessels and would result in the complete covering of the exposed mound and some natural seafloor beyond the existing perimeter of each shell mound. The integrity of the cap would need to be monitored as described in Section 2.3. Impacts and proposed mitigation measures discussed under PA1 above are also applicable to PA3.

For PA3, impact CRF-2 would consist of fisheries impacts resulting from the temporary preclusion of fishing boats in a safety zone near the mounds during capping and anchoring activities. This Class II impact is expected to be similar to those discussed for PA1 and PA2; however, the duration of preclusion within the anchor area would be somewhat longer (estimated at 10 to 15 days per mound) than for other Program Alternatives. For PA3, Impact CRF-2 can also be mitigated through implementation of CRF 2b, which provides compensation for loss of fishing catch.

Impacts during transit (CRF-5) would be different than those for PA1, since: (1) contaminated materials from the shell mounds would not be transported, (2) spillage of capping sediments during transit to the shell mounds sites would not cause a release of contaminants or to adversely affect fishing activities, and (3) the number of barge trips would be larger.

Although reestablishing trawlability is a primary goal of PA3, as discussed in Section 3.2.4.3, the status of the cap will need to be monitored and replenished if necessary. Whether trawling can be sustained over the capped shell mounds is uncertain. Accordingly, CRF-7 is not recognized for PA3.

The following additional impacts (CRF-8, CRF-9, and CRF-10) are applicable to PA3.

Program Alternative	*Impact #*	*Impact Description*	*Region/Location*	*Class*
PA3	**CRF-8**	Deposition of new material may resuspend sediments or damage the shell mounds, thus exposing commercially or recreationally fished species to contaminants.	Offshore Santa Barbara County (shell mounds sites)	II

Impact: CRF-8

This impact is equivalent to MB-7 as discussed in Section 3.3.4.3. Approximately 160 acres of the seafloor would be covered by the shell mounds plus capping material.

MITIGATION MEASURE(S) FOR IMPACT CRF-8

MMs WQ-7a, WQ-8a, and **WQ-9a** would apply to this impact.

RESIDUAL IMPACT(S)

These mitigation measures reduce the likelihood of contaminant releases and provide for the monitoring and remediation of damage to the cap. Residual impacts would be less than significant (Class III).

Program Alternative	*Impact #*	*Impact Description*	*Region/Location*	*Class*
PA3	**CRF-9**	The shell mounds and/or new materials may preclude certain types of fishing within the surrounding area.	Offshore Santa Barbara County (shell mound sites)	II

Impact: CRF-9

As previously stated, the presence of the four shell mounds eliminates approximately 10 percent (3.4 nm^2) of the area within Fish Block 652 that might have otherwise been trawled for halibut or other species (nominally estimated to be 0.5 mile [0.8 km] around the perimeter of each of the shell mounds). Although not quantified, MEC Analytical Systems (2002) suggested that the shell mounds support commercially harvested rock crabs (genus *Cancer*), and that recreational fishers (see Section 3.5.1.2) used the sites historically. Due to the need to prevent disturbance to the caps covering each shell mound, the area of, and around, the shell mounds may continue to be off limits to trawling, at least periodically, resulting the continuing loss of trawlable area (Class II).

MITIGATION MEASURE(S) FOR IMPACT CRF-9

CRF-9a *To minimize the area that trawlers avoid around the shell mound sites, the Applicant shall institute the previous commitment to provide Global*

Positioning System (GPS) navigation/net locator equipment to trawlers that utilize the area.

RESIDUAL IMPACT(S)

These mitigation measures will offset the resource impact and reduce the impact on the trawl fishers. GPS navigation/net-locator equipment will allow commercial fishers to fish much closer to the modified shell mounds. Compensation to affected fishers is needed for the disruption of their activities and their loss of fishing catch. Residual impacts would be less than significant (Class III).

Program Alternative	*Impact #*	*Impact Description*	*Region/Location*	*Class*
PA3	**CRF-10**	Due to the continuing presence of the shell mounds, there is a risk of exposure to contaminants from future disturbance or erosion of the mounds.	Offshore Santa Barbara County (shell mound sites)	II

Impact: CRF-10

Results of the Mussel Study (SAIC 2003) indicated that contaminants are not presently escaping into the water column. Placement of capping sediments over the mounds would, for an indeterminate amount of time, help to protect the mounds from future disturbances. However, there remains some risk that first the capping sediments and later the surficial layers of the shell mounds could eventually erode and release contaminants or otherwise be compromised, such as by anchoring, trawling, etc. Natural erosion could happen as a result of animal burrowing or scouring due to the formation of eddies around the rocks (pers. comm., D. Bedford, CDFG, 2003); however, the potential impact would be very localized as any material released would be dispersed into the surrounding medium.

MITIGATION MEASURE(S) FOR CRF-10

MM WQ-9a would apply to this impact.

RESIDUAL IMPACT(S)

As discussed in Section 3.2.4.3, these measures would allow for detection and repair of damage to the mounds before the possibility of contaminant releases. Residual impacts are less than significant (Class III).

3.5.4.4 Program Alternative 4 (PA4): Artificial Reefs at all Four Shell Mounds

This Program Alternative would leave the shell mounds at their present locations, but they would be enhanced with CDFG-approved hard substrate to create artificial reefs. PA4 would consist of placing a two-tiered “ring” of 3 feet (~1 m) diameter, quarried armor-type rock around the perimeter of each of the mounds; the single remnant leg stub at the Hazel site would remain in place. The resulting 6 feet of vertical relief would

provide hard substrate upon which epibiota could attach and voids that would be conducive to supporting cryptic fish and invertebrates. As described in Section 2.5, additional structures, such as hollow concrete reef balls (pers. comm., T. Raftican) could conceivably be added to the mounds to augment the amount of hard substrate and increase the vertical relief of the mounds. Impacts and proposed mitigation measures discussed under PA3 above are also applicable to PA4.

As previously stated, the presence of the four shell mounds eliminates approximately 10 percent (3.4 nm^2) of the area within Fish Block 652 that might otherwise be trawled for halibut or other species. Although not quantified, MEC Analytical Systems (2002) suggested that the shell mounds support commercially harvested rock crabs (genus *Cancer*), and that recreational fishers (see Section 3.5.1.2) used the sites historically. The continued presence of the shell mounds will preclude halibut trawling over the mounds and within some distance, nominally estimated to be 0.5 mile (0.8 km) around the perimeter of each of the shell mounds, resulting in the continuing loss of trawlable area (Class II).

Although contaminated materials would not be transported, impacts during transit (CRF-5) would be Class II, since spillage of reef-building materials during transit to the shell mounds sites could adversely affect trawling depending on the location of a spill. Results of the Mussel Study (SAIC 2003) indicated that contaminants are not presently escaping into the water column. Placement of reef materials in a perimeter around each of the shell mounds would help to protect the mounds from future disturbances from trawl nets.

The following additional impact (CRF-11) is applicable to PA4.

Program Alternative	*Impact #*	*Impact Description*	*Region/Location*	*Class*
PA4	**CRF-11**	Creation of artificial reefs at the shell mound sites would benefit recreational fishing opportunities.	Offshore Santa Barbara County (shell mound sites)	IV

Impact: CRF-11

As discussed in Section 3.3.4.4, the addition of high-relief, hard substrate is expected to result in some Class IV (beneficial) impacts to recreational fisheries by increasing the amount of locally limited hard substrate that would attract fish. Increases in biological diversity compared to that which currently exists at the shell mounds may also occur.

3.5.4.5 Program Alternative 5 (PA5): Artificial Reef at Hazel after Removing (5a) or Spreading (5b) Shell Mounds

Under PA5, an artificial reef would be constructed at the Hazel site only, using the caissons as the cornerstones of an artificial reef. Quarry rock of the same dimensions as used for PA4 would be used to fill in the structure of the reef between and around the caissons, resulting in a high-relief artificial reef covering approximately one acre of

seafloor. As with PA4, the structure of the reef could be augmented with other materials. The placement of a single relatively large reef at the Hazel site contrasts with the four relatively small reefs that would ring the shell mounds under PA4. There are two variants to this Program Alternative, depending on whether the shell mound materials are: a) removed as under PA1; or b) spread as under PA2. Each is discussed separately below. In both cases, the reef would preclude trawling, but provide potential recreational fishing opportunities. Impacts associated with PA5a and PA5b are summarized in Table 3.5-4 at the end of this section.

Program Alternative 5a (PA5a): Artificial Reef at Hazel Site plus Removal and Disposal of Shell Mounds

PA5a would employ the same dredging and transport procedures and have similar potential impacts and corresponding mitigation measures as PA1, minus the potential impacts associated with: (1) the use of explosives to demolish the Hazel caissons (CRF-4). Impact CRF-5 for PA5a would apply to the transport of both dredged materials and quarry rock.

PA5a would also have beneficial impacts related to the removal of the shell mounds and restoration of natural seafloor conditions on three of the four former platform sites, including minimizing potential fishing gear damage and loss. Impacts and corresponding mitigation measures associated with construction of an artificial reef at the Hazel site would be similar to those discussed for PA4, minus the potential impact associated with dropping reefing materials on top of the Hazel shell mound (which will have been removed). Impact CRF-9 (continuing preclusion of trawling) would, for PA5a, occur at the Hazel site; however, the reef would provide potential recreational fishing opportunities.

Program Alternative 5b (PA5b): Artificial Reef at Hazel Site plus Leveling and Spreading Shell Mounds

PA5b would employ similar procedures and have similar impacts and corresponding mitigation measures as PA2 (except for explosive demolition and transport of the Hazel caissons) and PA4. Impacts and corresponding mitigation measures associated with construction of an artificial reef at the Hazel site would be similar to those discussed for PA4, minus the potential impact associated with dropping reefing materials on top of the Hazel shell mound (which will have been leveled). An artificial reef at the Hazel site would occupy approximately 1 acre and consist of high-relief structures in a large-boulder matrix; the reef would preclude trawling (Impact CRF-9), but provide potential recreational fishing opportunities.

3.5.4.6 Program Alternative 6 (PA6): Offsite Mitigation

Under PA6, no action to remove or modify the shell mounds is proposed. The shell mounds and remnant caissons would remain in place in their present state. Impacts and corresponding mitigation measures CRF-9 and CRF-10, discussed above under PA3 and PA4, are also applicable to PA6.

Impact: CRF-9 (PA6)

De Wit (2001) reports historical conflicts between commercial fishing operations and the shell mounds that have included damage to trawl nets and collection of debris in the nets. Previously, the Applicant has provided commercial trawlers with funds that were to be used for improved vessel navigation equipment, thus allowing fishers to utilize the natural seafloor in closer proximity to the mounds. Under PA6, the Applicant would institute the previously agreed-to provision of net-finder positioning equipment to commercial trawlers (MM CRF-9a). This equipment would indicate the precise location of the net relative to the vessel and lessen the chances that fishing gear would be impacted by the shell mound material. With the net-finder equipment, the area currently unavailable to halibut trawlers, approximately 3.4 nm^2 is expected to be significantly reduced.

The loss of fishery resources covered by the shell mounds warrants additional mitigation. The habitat value of the existing shell mounds for commercial and recreational fish and invertebrate species is low and has decreased with the removal of the platform structures (de Wit 2001). It is expected that natural sedimentation will eventually cover the exposed shell material, thus further reducing the amount of solid substrate habitat and the abundance and diversity of associated epibiota and fish. Similarly, as the mounds continue to be covered with sediment, the marginal value of the existing habitat for recreational fishing is expected to be further reduced.

ADDITIONAL MITIGATION MEASURE(S) FOR IMPACT CRF-9 (PA6)

CRF-9b *To offset the permanent replacement of 4 acres of native seafloor habitat by the shell mounds, the Applicant shall create or restore an equal area of fisheries habitat by funding estuarine habitat restoration at Carpinteria Marsh.*

MM CRF-9a would also apply to this impact.

RESIDUAL IMPACT(S)

This measure provides a 1:1 replacement ratio, using shallow marine-estuarine habitat at Carpinteria Marsh to offset the permanent coverage of natural seafloor habitat at the shell mounds sites. Implementation of MM CRF-9b would benefit local fishing interests. The provision of net-finder equipment and the other measures that are part of PA6 are considered appropriate to mitigate potentials impacts to trawling activity. Following implementation of MM CRF-9b, residual impacts of leaving the mounds in place would be less than significant assuming that the 1:1 replacement ratio is reached. If not, the Applicant would need to implement a package of additional fishery enhancement measures to reach the 1:1 requirement. These measures could include the following, based on input from fisheries organizations:

1. *Funding a marine weather station on East Anacapa Island through the Santa Barbara Fisheries Enhancement Fund.*

2. *Upgrading onboard safety equipment and/or refrigeration systems on trawl vessels*.

3. *Funding research on stock assessment and/or enhancement of commercial fish.*

Impact: CRF-10 (PA6)

See previous discussion under PA3 and PA4. The risk of impact is somewhat greater for PA6 than for PA3 and PA4 because the latter provides for protection of the shell mounds through: (1) placement of a cap on top of each shell mound (PA3), or (2) the armoring of the shell mounds by placement of a reef around the perimeter of each shell mound (PA4).

MITIGATION MEASURE(S) FOR CRF-10

MM WQ-9a would apply to this impact.

RESIDUAL IMPACTS

With the mitigation of potential long-term risks of contaminant releases, the continued presence of the shell mounds is not expected to result in any significant impacts to the recreational fishery, nor will their presence add any significant habitat for commercial or recreational fish and invertebrate taxa. With time and the subsequent decrease in the solid-substrate nature of the habitat, the resulting sedimentary, high-relief features would be expected to support similar fish and invertebrate taxa as those found on and in the surrounding, natural sedimentary habitat.

3.5.4.7 No Project Alternative

Impacts

Under the No Project Alternative, the shell mounds would be left in place and no on- or offsite mitigation measures would be implemented. As such, there would be a continuation of the following impacts as discussed in previous sections:

1. Permanent loss of four acres of natural seafloor habitat.

2. Preclusion of trawling over an estimated 3.4 nm^2 (11.7 km^2 or 3,882 acres).

3. Ongoing risk of contaminant releases from the shell mounds if the mounds are damaged.

Table 3.5-4. Summary Matrix of Potential Impacts to Commercial and Recreational Fishing Associated with Program Alternatives

Program Alternative	*Impact #*	*Potential Impact*	*Impact Class*	*Mitigation Measures*
PA1	CRF-1	Removal of the 4H shell mounds would permanently remove contaminated sediments associated with the shell mounds from the marine environment.	IV	*None proposed.*
	CRF-2	Commercial and recreational fishing would be precluded in the project vicinity during project activities.	II	*MM CRF-2a. The Applicant shall provide 30-day advance notice of pending activities at the shell mounds sites to enable fishers to avoid the affected area. Specifically, the Applicant shall ensure that: (1) notification is received by the Joint Oil/Fisheries Liaison Office and posted at the Harbor Masters offices in Morro Bay, Avila, Santa Barbara, Ventura, Channel Islands, and Hueneme; and (2) project information is provided in the Local Notice to Mariners issued by the Eleventh Coast Guard District. Information provided shall include, at a minimum, a description of the proposed action, a map of the project site(s), and an estimate of the expected duration of project activities.* *MM CRF-2b. The Applicant shall compensate fishers who are able to demonstrate a loss of catch. Compensation shall be based on the average of the previous five years catch during the season and area of activity.*

Table 3.5-4. Summary Matrix of Potential Impacts to Commercial and Recreational Fishing Associated with Program Alternatives (continued)

Program Alternative	*Impact #*	*Potential Impact*	*Impact Class*	*Mitigation Measures*
PA1	CRF-3	Contaminants, including oil, released during project operations will disperse into the water column and onto the seafloor, resulting in the exposure of commercially and recreationally fished species to contaminants, with potential toxic or bioaccumulation effects (see WQ-2, WQ-3, and MB-2).	II	*MMs WQ-2a through 2e, WQ-3a, and MB-2a*
	CRF-4	Explosive demolition of the caissons at the Hazel site will result in the mortality of fishes that are commercially or recreationally harvested in the immediate vicinity.	II	*MM MB-6a*
	CRF-5	The transport of materials may interfere with fishing boats, result in accidental spillage that could expose fishery resources to contaminants, or otherwise conflict with fishing activities.	II	*MM MB-4a and -4b*
	CRF-6	Ocean disposal of shell mounds sediments at LA-2, if approved, would have potentially toxic effects on marine biota.	I	*None proposed*
	CRF-7	Removal of the 4H shell mounds and caissons would restore trawling and other types of fishing to the areas occupied by and adjacent to the mounds where such fishing activities have been prevented.	IV	*None proposed*
PA2		CRF-2	II	*MM CRF-2a and -2b*
		CRF-3	II	*MMs WQ-2a through 2e, WQ-3a, and MB-2a*
		CRF-4	II	*MM MB-6a*

Table 3.5-4. Summary Matrix of Potential Impacts to Commercial and Recreational Fishing Associated with Program Alternatives (continued)

Program Alternative	*Impact #*	*Potential Impact*	*Impact Class*	*Mitigation Measures*
PA2		CRF-5	II	*MM MB-4a, and -4b*
PA3		CRF-2	II	*MM CRF-2a and -2b*
		CRF-3	II	*MMs WQ-2a through 2e, WQ-3a, and MB-2a*
		CRF-5	II	*MM MB-4a, and -4b*
	CRF-8	Deposition of new material may resuspend sediments or damage the shell mounds, thus exposing commercially or recreationally fished species to contaminants	II	*MM WQ-7a* *MM WQ-8a* *MM WQ-9a*
	CRF-9	The shell mounds and/or new materials may preclude certain types of fishing within the surrounding area.	II	*MM CRF-9a. To minimize the area that trawlers avoid around the shell mound sites, the Applicant shall institute the previous commitment to provide Global Positioning System (GPS) navigation/net locator equipment to trawlers that utilize the area.*
	CRF-10	Due to the continuing presence of the shell mounds, there is a risk of exposure to contaminants from future disturbance or erosion of the mounds.	II	*MM WQ-9a*
PA4		CRF-2	II	*MM CRF-2a and -2b*
		CRF-3	II	*MMs WQ-2a through 2e, WQ-3a, and MB-2a*
		CRF-5	II	*MM MB-4a, and -4b*
		CRF-8	II	*MM WQ-7a* *MM WQ-8a* *MM WQ-9a*

Table 3.5-4. Summary Matrix of Potential Impacts to Commercial and Recreational Fishing Associated with Program Alternatives (continued)

Program Alternative	*Impact #*	*Potential Impact*	*Impact Class*	*Mitigation Measures*
PA4		CRF-9	II	*MM CRF-9a*
		CRF-10	II	*MM WQ-9a*
	CRF-11	Creation of artificial reefs would benefit recreational fishing opportunities.	IV	*None proposed.*
PA5a		CRF-1	IV	*None proposed.*
		CRF-2	III	*MM CRF-2a and –2b*
		CRF-3	II	*MMs WQ-2a through 2e, WQ-3a, and MB-2a*
		CRF-5	II	*MM MB-4a, and -4b*
		CRF-9	II	*MM CRF-9a*
		CRF-11	IV	*None proposed.*
PA5b		CRF-1	IV	*None proposed.*
		CRF-2	III	*MM CRF-2a and -2b*
		CRF-3	II	*MMs WQ-2a through WQ-2e, WQ-3a, and MB-2a*
		CRF-5	II	*MM MB-4a, and –4b*
		CRF-9	II	*MM CRF-9a*
		CRF-11	IV	*None proposed.*
PA6		CRF-9	II	*MM CRF-9a* *MM CRF-9b. To offset the permanent replacement of 4 acres of native seafloor habitat by the shell mounds, the Applicant shall create or restore an equal area of fisheries habitat by funding estuarine habitat restoration at Carpinteria Marsh.*
		CRF-10	II	*MM WQ-9a*